DOCUMENT RESUME

ED 418 710 EC 305 434

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TITLE Assistive Technology & Inclusion. Issue Brief.
INSTITUTION Allegheny Univ. of the Health Sciences, Pittsburgh, PA.
SPONS AGENCY Special Education Programs (ED/OSERS), Washington, DC.
PUB DATE Mar 97
NOTE 4p.; A collaborative publication of the Consortium on Inclusive Schooling Practices. (CISP)
CONTRACT H029-40007
AVAILABLE FROM Child & Family Studies Program, Allegheny University of the Health Sciences, One Allegheny Center, Suite 510, Pittsburgh, PA 15212; telephone: 412-359-1654; fax: 412-359-1691.
PUB TYPE Guides - Non-Classroom (055) -- Reports - Descriptive (141)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Assistive Devices (For Disabled); Augmentative and Alternative Communication; Case Studies; Communication Aids (For Disabled); Elementary Secondary Education; *Inclusive Schools; Mainstreaming; *Severe Disabilities

ABSTRACT

This paper uses a case study of the inclusion of a deaf-blind child with cognitive disabilities to explain principles of applying assistive technology in inclusive educational settings. The 12-year-old's progress from a special school four years previously to full inclusion is recounted with emphasis on use of such adaptive equipment as adapted switches, an assisted communication system, and seating and positioning adjustments. The case study illustrates the following principles: (1) involve the student with the disability in the selection of assistive technology devices; (2) begin by targeting a specific activity in which the student needs or wishes to participate, then find and/or adapt equipment rather than the other way around; and (3) look for people beyond the educational realm to help with technical expertise. (DB)

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Policy Research
ISSUE BRIEF
Practice
March 1997
Consortium on Inclusive Schooling Practices

ED 408 718

Assistive Technology & Inclusion

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EC 305 609

Meet Joey. Identified as having cerebral palsy and also being "deaf-blind with cognitive disabilities," Joey spent the first four years of his school career in a special day class, where he spent a great deal of time lying in a beanbag chair. He had no consistent method of communication other than screaming and crying, which he used when staff attempted to engage him in an activity. Even the peer helpers from general education classes avoided contact with Joey. The majority of interactions that students or staff had with Joey were to provide personal care services, such as feeding and changing his diaper. About the time that Joey turned eight, his life changed significantly as assistive technology was introduced into his range of supports and services.

Special educators, who support students such as Joey in inclusive settings, are becoming more proficient at adapting core curriculum, infusing basic skills into daily activities, and scheduling staff, students and other resources to best meet students' needs. Although many educators are utilizing a range of "supplementary aids and services" necessary to educate students with disabilities with their non-disabled peers, many are not sufficiently familiar with assistive technology to use it effectively. Using Joey's story as a backdrop, we will illustrate the importance of utilizing the full spectrum of supports and services, including the use of assistive technology, for implementing effective inclusive education practices for students with significant disabilities. A number of assistive technology resources will also be identified at the end of this article.

Many professionals have limited experience with the use of assistive technology. Those who attempt to acquire it for their students rarely consider applications of technology beyond computers, wheelchairs or commercially available communication devices. Fortunately, Joey's teachers and advocates became familiar with the wide

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range of assistive devices that could increase Joey's access to his world. They quickly learned that using the right combination of adaptations could impact his education and his interactions with his peers. The following story details the changes that occurred in Joey's life as he began to use both customized adaptations and commercially available products to support his full-time membership in general education.

Four years ago when he was eight years old and still attending a special day class, Joey began to learn about cause and effect through the use of a set of adapted switches connected to a Bart Simpson toy. The standard remote control switch for the toy featured one button to move Bart forward, a second to move him backward. The remote control was rewired so that Joey could hit either a large plate switch for forward motion or a large pillow switch to reverse the movement. Due to Joey's limited vision, the toy was placed on a table so that, at the very least, he could feel the vibration of the toy moving across the table's surface. As soon as Joey became engaged in the activity, exciting things happened. First, he clearly began to follow the movement of Bart's bright yellow head as it moved across his field of vision. Second, peers in the room saw this activity as a way to interact with Joey. Finally, as his peers helped him to press the switches, Joey began to associate the operation of the switch with the movement of the toy. As a result, his peers began to consider many more activities in which Joey could participate. The classroom teacher set up a variety of appliances that could be switch-controlled so that Joey could practice throughout the day. It became obvious that Joey could perform these same activities in general education classes.

Over the next couple of years, Joey began spending more time in general education classes where he participated in activities instead of simply observing them. He became more proficient at switch use and was able to operate a number of individualized devices. One device was used for climate control. Because the school operated on a year-round schedule, the children had to acclimate to warm classrooms. Some teachers permitted students to take turns "misting" the classroom. Joey participated by using a switch-operated spray bottle which was modified from a sports bottle. While a classmate pointed the sprayer in different directions, Joey operated the water flow. Other adaptations included a plexiglass display board that was used for communication, and a variety of appliances that he controlled with his switches.

By the time Joey entered fifth grade, he made the transition from being a "visitor from Room #5" to being a fulltime member of the class. New situations required new adaptations. Joey's classmates had been responsible for raising Joey's hand to summon the teacher, but they felt that Joey needed his own method. A "low-tech" light switch was mounted on Joey's laptray so that he could attract the teacher's attention. His ability to use a switch increased so that he could use several of them coded with Picture Communication Symbols to operate a Speakeasy communication device with messages recorded by a student whom he chose. He used another switch to turn on a tape recorder to play the same book on tape that the other students were reading during "silent reading" time. Consistent use of switches helped to increase his motivation and dexterity for accessing the computer through the Ke:nx program. These abilities would be essential for participating at his neighborhood middle school.

Joey's seating and positioning needs were adjusted, including time scheduled to be out of his wheelchair, sitting at a desk. His therapy needs were met during the regular physical education periods, as coordinated by his teacher, with consultative support from the school district's physical therapist and adaptive physical education specialist. The special education teacher worked closely with the fifth grade teacher to adapt the curriculum and make accommodations as necessary. Joey's classmates were an invaluable source of creativity who thought of innovative strategies to increase Joey's participation. As they became more familiar with Joey and the way in which he responded, they were key players in identifying new goals based on their keen insights and perceptions of Joey's needs and desires. The entire range of services and supports that were listed on his IEP were designed and implemented through effective collaboration of all of the professionals involved. People learned to perform their roles in new settings and under different circumstances. By the end of the school year, everyone agreed that Joey had surpassed all earlier expectations. Eventually it was determined that Joey no longer required services from the vision and hearing specialists, as he was obviously using both of these sensory modes adequately in all of his daily activities. His transition plan for moving to the middle school included a discussion of scheduling him into classes where he would remain with a number of his fifth grade classmates. The possibilities for Joey are endless, and as luck would have it, his new school is a technology magnet, a perfect place for him to continue to build his skills in using all kinds of technology.

As Joey's story illustrates, it is essential to consider technology from a number of perspectives. There is a wealth of material on accessing assistive technology resources. However, these resources are often underutilized and will remain so until teachers and other school professionals learn the basics. There are a number of issues that need attention when considering the use of assistive technology.

1. **Involve the student with the disability in the process.**

   Studies show that one of the main reasons individuals do not use assistive technology devices, even when they would be helpful, is because they were not involved in the selection of the equipment (Scherer, 1993)[1]. We all have priorities of color, style, and durability. Some students enjoy the attention that accompanies using a device with lots of bells and whistles; others have a difficult time with being the center of attention. Family members as well as peers are often helpful in determining such details. By involving families in the process, the likelihood of technology use at home is greater. By involving peers in the process, on-the-spot problem solving occurs on a regular basis. Such critical thinking skills can be incorporated into science and social studies lessons as students are introduced to the use of assistive technology. As an experiential component, they may then require the students to invent an item that could be used by an individual with a disability.

2. **Target a specific activity.**

   It is extremely difficult to buy or design an adaptation if the end goal is not clear. Often professionals look for devices that are available and then try

[1] Scherer, M. (1993). *Living in the State of Stuck*. Cambridge, MA: Brookline Books.

to "fit" them to the students. This is problematic because if the student's priorities are not considered, it is unlikely that the device will be utilized. A more productive approach is to identify the activity in which the student needs or wishes to participate so that the initial research into existing adaptations takes on a direction. For example, if a student wants to join a game of foursquare with her fourth grade classmates, and has enough volitional movement to operate a switch but not to throw a ball, research could begin with a search through a database, such as HyperAbledata , to determine if there is a commercial device that would allow for the student's participation. There are also numerous catalogs which list recreational equipment, some of which might be adapted or some that have the potential to be modified to fit a student's needs. Searches should not be limited to "adaptive catalogs" as many useful devices can be found in novelty catalogs and hardware stores.

3. **Look for people with "technical expertise" beyond the educational realm.**

Teachers rarely consider identifying people who have specific skills in carpentry, electronics, mechanical engineering, computers, and general "fix-it" skills to help with the design and construction of adaptations. There are a number of programs across the country that use volunteers to help develop customized adaptations for individuals. Once activities and technology needs have been identified, tapping into service organizations (Kiwanis, Lions, Optimists, etc.) for additional expertise and funding can bring remarkable results. Coordinating efforts with technical classes in high schools, community colleges anduniversities which require specific projects (e.g., senior projects required in mechanical engineering courses) can provide mutual benefits. Brainstorming takes on a new dimension when engineers share ideas with third graders and jointly design a project. These strategies tend to be very cost-effective. While many people assume that assistive technology is expensive, low-tech adaptations can be effective and affordable.

SUMMARY

Joey and his teachers discovered that there was more to assistive technology than wheelchairs and that it was essential to include family, friends and professionals with expertise in appropriate disciplines when considering new possibilities. As his teachers observed and explored Joey's use of customized and commercial products, they realized the need for ongoing evaluation to ensure that Joey's needs continued to be met. His needs, likes, and skills will change as he moves to new challenges and environments. The demands and opportunities of these settings will provide new challenges to support his active involvement in academic coursework and social interactions. As he attends middle school and beyond, Joey will be likely to outgrow equipment or prefer a different color for a device. More importantly, he will also build more confidence and take on new responsibilities as he increases his skills. As Joey's experience with assistive technology continues, his opportunities to be a valued member of his school and community are limitless.

The world of assistive technology is changing rapidly as attempts are made to improve the quality of life for everyone. As overwhelming as it may seem to try to

remain current with technological advancements, it is becoming much easier to access information and resources through newsletters, "how-to" videos, and on-line services. While only a handful are included here, each of the resources includes its own set of additional references. Many companies that sell assistive technology devices or equipment have promotional videos available at no cost.

The listings included here are current as of November 1995. For more information on local resources, contact your state's Assistive Technology Project. For up-to-date details, check out one of the World Wide Web sites listed under Assistive Technology, listed under Disability Resources, **(http://www.icdi.wvu.edu/ others.htm#g10)**.

CISP Publications and Resources

The ***CISP Issue Brief*** series is a collaborative publication of the Consortium on Inclusive Schooling Practices (CISP), a five-year project (86V-40007) supported by the U.S. Department of Education, Office of Special Education, under cooperative agreement with the Allegheny University of the Health Sciences (formerly Allegheny-Singer Research Institute). Principal partners with AUHS include the National Association of State Boards of Education, San Diego State University, and the University of Montana.

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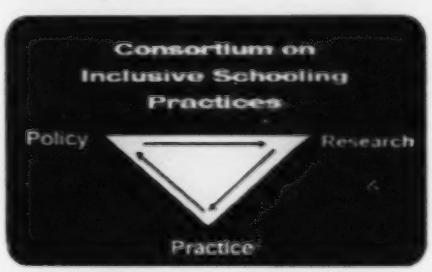

Preparation of this document was supported by Cooperative Agreement (86V-40007) from the U.S. Department of Education, Office of Special Education Programs, to Allegheny University of the Health Sciences (formerly Allegheny-Singer Research Institute). The opinions expressed herein do not represent those of the U.S. Department of Education and no official endorsement should be inferred.